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ABSTRACT

The purpose of this study is to use some techniques developed for describing the environments of U.S. universities to explore the correlation between national characteristics and university characteristics in the British Commonwealth. Because such techniques have been little used outside the U.S., the study first examines their appropriateness for describing Commonwealth universities. Finally, the study uses one of these techniques to examine the collegial organization of Cambridge and Oxford. Results for 186 universities suggest that these techniques are appropriate for characterizing Commonwealth universities, including Oxford and Cambridge colleges, and that national characteristics and university environments correlate fairly meaningfully in the Commonwealth. Therefore, this study helps provide a broader, more international context for studying university environments. (Author)

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"Environments" of British Commonwealth Universities

James M. Richards, Jr.

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Universities have goals and traditions that transcend differences among nations, and therefore an interesting question is whether nations with different characteristics also have universities with different characteristics. Techniques for describing how colleges and universities differ have been developed by psychologists and other behavioral scientists in the United States (Astin, 1962, 1968; Astin and Holland, 1961; Pace, 1963; Richards, Seligman, and Jones, 1970; Richards, Bulkeley, and Richards, 1972; Stern, 1970), but only a few studies (Richards, Rand, and Rand, 1968; Richards, 1973) have used these techniques to study institutions outside the United States. The purpose of the present study is to use some of these techniques to explore the extent to which national characteristics and university characteristics (or university "environments") correlate in the British Commonwealth. Because such techniques have been little used outside the United States, the study first examines evidence of the appropriateness of these techniques for characterizing British Commonwealth universities. Finally, the study uses one of these techniques to examine the collegial organization of Oxford and Cambridge. Holland's (1973) theory of interpersonal environments provides an overall framework for much of this investigation.

Procedure

Sample of Universities. The source of data for this study was the 1969 Yearbook of the Association of Commonwealth Universities. This compendium includes data for member institutions of the Association, plus universities in Ireland and South Africa[2], and presents detailed information

mation for all these universities except those established most recently.

The sample consisted of 186 universities with complete data. Whenever the Yearbook data permitted, geographically separated campuses with a common administration were treated as separate institutions. For example, the three campuses of the University of the West Indies (in Jamaica, Trinidad, and Barbados) were treated separately. The major problems, and perhaps the major biases, for this study occurred in India and Pakistan, where most universities are "affilative" examining bodies, with little if any centralized faculty and instruction. This study includes only those universities in these two countries that appeared to be "unitary teaching" universities, either by official designation or in terms of the data presented in the Yearbook. The examining body form of university organization is modelled on the University of London, and that university too was excluded from this study to reduce differential bias among nations. For analyses at the university level, Oxford and Cambridge were treated as unitary institutions despite their collegial organization.

It is arguable whether this group of universities constitutes a sample or a population (and therefore whether it is meaningful to use tests of statistical significance). In a strict statistical sense this group seems more nearly a population, but this study is of less interest if one does not make some sort of generalization beyond these particular universities. Also, some readers may choose to regard these universities as a sample and wish to know the statistical significance of the results. Accordingly, significance levels are reported where computable.

Environmental Measures. Two sets of environmental measures were used in this study. The first grows out of Holland's (1973) theory that people

in various occupations have characteristic personalities, either because people with differing personalities are attracted to characteristic occupations or because differing occupations mold personality in characteristic ways. Specifically, one's occupation corresponds to one's personality type -- Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. It follows that an interpersonal environment is a function of the number, or relative number, of people with these personality types composing that environment. The basic procedure for assessing an environment, therefore, is simply to count the number of people in that environment whose occupations fall into each of the six types. Usually some control for the size of the environment (i.e., the total number of people) is necessary, such as computing the per cent of the people who fall into the six types. Variations of this procedure have been successfully applied to measuring college and university environments in the United States (Astin, 1965; Astin and Holland, 1961; Richards et al., 1970, 1972) and in Japan (Richards, 1973).

In the present study the number of faculty members at each Commonwealth university falling into each type was determined. To reduce skewness, a square root transformation was used for most analyses involving the number of faculty falling into the six types. Assignment to types was based on the specific academic discipline cited for each individual faculty member in the Yearbook. Disciplines were assigned to types on the basis of several empirical classifications for occupations and major fields developed by Holland and his associates (Holland, 1966; Holland, Viernstein, Kuo, Karweit, and Blum, 1970; Viernstein, 1971). Realistic fields are typified by agriculture and civil engineering; Investigative fields by biology and physics; Artistic fields by literature and foreign languages, Social fields by education and sociology; Enterprising fields by economics and law, and

Conventional fields by accounting. The number of faculty in a given type measures absolute emphasis on that type, but also strongly involves university size. The percent of faculty in each type at each university was also computed to measure relative emphasis on the six types. These percents were transformed separately for each type to normalized standard scores by the percentile procedure. While this transformation did succeed in making the scores more nearly normal, its major effect was to place them on a scale more suitable for correlational analysis. Regardless of the transformation, of course, the percent scores are ipsative in that a university with a high score on one type must have low scores on the other types. Therefore, statistical tests involving the six distributions of percents are not completely independent.

The second set of environmental measures used in this study are based on factor analytic investigations of the environments of two-year (Richards, Rand, and Rand, 1966) and four-year (Astin, 1962) institutions in the United States and of universities in Japan (Richards, 1973). Three factors appeared common to all of these studies. The first was simply institutional Size. The second was Affluence in the sense of having a large budget and extensive facilities (e.g., library, faculty, etc.) relative to the number of students. The third might best be termed Technological Emphasis. High scoring institutions offer extensive training in engineering, have a large percentage of males in their student body, and are characterized by secular (rather than religious) control or orientation. Because comparable results were obtained in the United States and Japan, it appears that these three dimensions may be appropriate for universities in many nations.

Accordingly, measures of Size, Affleunce, and Technological Emphasis were developed for each university.[3] Size was measured by the total number of full-time students. A square root transformation was made to reduce skewness. The measure of Affluence involved two variables: (1) university

income per full-time student (in Canadian dollars at 1969 exchange rates), and (2) the number of library books per full-time student. These variables were equated for mean and standard deviation and combined with unit weight. Technological Emphasis was also measured by a unit weighted combination of two equated variables chosen on the basis of empirical results from previous studies (Astin, 1962; Richards, 1973). To avoid overlap with the Realistic type score, no direct measure of technological education was included. The first variable was the percent of males in the full-time student body, and the second was a measure of secular orientation in which (prior to the equating transformation) universities under religious control scored 1, secular universities offering training in religious subjects scored 2, and secular universities without religious training scored 3. Last, the distributions on Size, Wealth, and Technological Emphasis were converted separately to (unnormalized) standard scores with mean = 50 and standard deviation = 10.

All of these variables represent non-reactive measures (Webb, Campbell, Schwartz, & Seechrest, 1966) of the "objective" university environment. In the United States such measures have been shown to be correlated with reactive measures of the psychological, or phenomenological, university environment (Astin, 1963: Richards, et al., 1970), but it has not been determined whether this is true in the British Commonwealth. It is also undetermined whether Holland's notions about the relationship between occupation and personality apply in the Commonwealth, although there is some evidence (Lonner, 1968) that vocational interests and some occupations are similarly related in several non-Commonwealth nations. Finally, this study represents a "man for Mars" point of view (Townsend, 1971) in that the investigator has no personal experience with any Commonwealth university. Therefore, this first study of Commonwealth university environments should be interpreted with restraint.

Table 1 summarizes the central tendencies and variabilities of the type scores. A marginal totals Chi Square — based on the total number in each type at each university— rejected (χ^2 = 14,386.92, d. f. = 925) the null hypothesis of no variation among universities with respect to type distributions well beyond the .01 level. Most emphasis is placed on

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Insert Table 1 about here.

Investigative, Artistic, and Social fields and the least on Conventional fields. In other words, Commonwealth universities appear to place most emphasis on the physical and biological sciences, next most on the liberal arts, and next most on such fields as teacher education, the social sciences, etc. This pattern is similar to the one obtained for universities in the United States (Richards, et al., 1970) and in Japan (Richards, 1973).

Next, correlations were computed between the type scores and the measures of Size, Affluence, and Technological Emphasis. Table 2 summarizes these results. More than half of the correlations are signif.cant,

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Insert Table 2 about here.

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and each environmental measure is correlated with several type scores.[4] These correlations seem to reflect primarily contrasts between large and small universities and between universities which do and do not emphasize

technological training. The pattern of correlations between Technological Emphasis and the percent of faculty in the various types is similar to the pattern of correlations found for universities in the United States (Richards, et al., 1970) and Japan (Richards, 1973). That is, Technological Emphasis is positively correlated with an emphasis on Realistic and Investigative fields and negatively correlated with an Artistic and Social Emphasis. The patterns of correlations for Size and Affluence, however, show considerable deviation from the pattern obtained in these earlier studies. In both the United States and Japan, Size is positively correlated with a relative emphasis on Realistic fields and is not significantly correlated with an Investigative Emphasis. (In all countries, of course, Size is positively correlated with the number of faculty members in each of the types.) In the British Commonwealth, Size is positively correlated with a relative emphasis on Investigative fields and is not significantly correlated with a Realistic emphasis. Similarly, in the United States and Japan Affluence is correlated positively with Realistic and negatively with Artistic, while the reverse pattern holds in the Commonwealth. These differences presumably can be attributed to differing histories of university development in the various nations.

To check the extent to which national differences in these relationships occur within the British Commonwealth, the environmental measures were correlated with the type scores separately for universities in Britain and in Canada (the only nations with enough universities for such computations to be meaningful). Table 3 summarizes the results. Again the results suggest

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Insert Table 3 about here.
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reasonable consistency across nations for the correlates of Technological Emphasis, but some variation between nations for the correlates of Size and Affluence. If we interpret these results as population correlations so statistical tests are irrelevant, several of the correlations involving Affluence are of opposite sign for Britain and Canada. This pattern certainly suggests differences in the fields in which these nations invest, but it does not indicate whether such differences reflect value differences or merely reflect historical contingencies.

The next analysis examined the question of whether national characteristics and university characteristics are correlated. Sawyer (1967) found that much of the variation among nations can be described by just three relatively independent dimensions: Size, Wealth, and Political Orientation (i.e., communist, neutral or anti-communist). Measures of these three dimensions were determined for each of 27 nations (or political subdivisions) that included one or more of the studied universities. Size was measured by the total national population, Wealth by per capita income (in Canadian dollars at 1969 exchange rates), and Political Orientation, following Sawyer, by a trichotomous variable with scores of 1 assigned to nations having a military alliance with the United States, scores of 2 to "neutral" nations, and scores of 3 to Communist nations. In the present study, of course, this variable primarily contrasts "neutrality" vs. military alliance with the United States.

In some cases, a judgmental element was involved in deciding how to treat a particular university or geographic subdivision. Each campus of the University of the West Indies again was treated as a separate university and each island incorporating a campus was treated as a separate nation. A similar procedure was followed for the various campuses of the University of East Africa. On the other hand, Lesotho alone was treated

as the home of the University of Botswana, Lesotho, and Swaziland, since the only campus is located in Lesotho.

The characteristics of nations were correlated with the average university profiles within nations. Results are shown in Table 4. It appears from these results that the characteristics of universities do

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Insert Table 4 about here.
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indeed vary systematically with the characteristics of British Commonwealth nations. Large nations have large universities which emphasize Realistic fields. Wealthy nations have large, affluent universities which emphasize Artistic and Conventional fields. (Perhaps a certain amount of wealth is necessary before it is worthwhile educating accountants to keep track of it.) Neutral countries tend to have small universities which emphasize Social fields. In most cases this means they emphasize teacher training.

Some Commonwealth universities, most notably Cambridge and Oxford, are organized more into relatively autonomous colleges than into a centralized university structure. This organizational pattern is especially suitable for exploring the extent to which Holland's (1973) typology also is useful for measuring sub-environments within universities, so the last analysis for this study used the typology to examine the environments of Oxford and Cambridge colleges. Specifically, a count was made of the number of faculty members at the various colleges falling into Holland's types. (This count included all "members" of these colleges rather than just "fellows".) Because only one individual was classified as Conventional, that type was excluded from subsequent analyses for these colleges.

A square root transformation was used to reduce skewness. The trans-

formed data for colleges at Oxford and Cambridge combined were analyzed with the configurational analysis procedure developed by Cole and Cole (1970). Briefly, the original observation vectors were located in a (reduced) space defined by principal components. This space was then projected onto the best fitting plane to provide a "picture" of the spatial configuration of the original vectors.[5] The distances between points in this picture are direct measures of the similarity between the same points. (That is, similar points are close together while dissimilar points are far apart.)

Figure 1 shows the resulting configuration of the vectors for Cam-

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Insert Figure 1 about here.

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bridge and Oxford colleges, as well as the vectors corresponding to the Holland types. The configuration of these type vectors departs from expectations (Holland, 1973) in that Social and Enterprising show virtually no separation. The configuration of colleges reveals a broad discrimination between Cambridge and Oxford. (About two-thirds of the Cambridge colleges are to the right of the vertical axis and about two-thirds of the Oxford colleges are to the left.) This provides some support for treating these universities as unitary institutions in earlier analyses. In general Oxford colleges appear to be more Artistic, (i.e., to emphasize the liberal arts) than Cambridge colleges, while Cambridge colleges appear to be more Realistic (i.e., to emphasize technical education) than Oxford colleges. These results in combination with the underlying theory (Holland,

1973) imply that the interpersonal environment of Oxford colleges would be described more by such adjectives as complicated, emotional, impractical, and intuitive while the interpersonal environment of Cambridge colleges would be more described by such adjectives as frank, stable, masculine, and uninvolved. There is considerable interpenetration, however, with some Oxford colleges being more typical of Cambridge, and vice versa. Oxford colleges appear to be considerable more heterogeneous than Cambridge colleges. The most distinctive college seems to be Oxford's Nuffield, which appears to emphasize Social and Enterprising fields (e.g., the social sciences and economics). Similarly, St. Cross and Wolfson at Oxford and Clare Hall at Cambridge are relatively distinctive, probably in an emphasis on science and technology. In view of such differences, an obvious question is the extent to which the configuration shown in Figure 1 corresponds to the experience of persons at Oxford and Cambridge.

Discussion

Overall, the results indicate that in the British Commonwealth: (1) universities differ significantly on the environmental measures, (2) different measures of the university environment are meaningfully related to each other, and (3) university characteristics and characteristics of nations correlate fairly meaningfully. Therefore, the results suggest that these measures are appropriate and useful for characterizing Commonwealth universities and might now be used to investigate such problems as the relationship between objective and phenomenological university environments or the relationship between university environment and differential impact on students in the Commonwealth. In such studies, the underlying psychological theory (Holland, 1973) could provide a fruitful source of hypotheses amenable to empirical testing.

The results are generally consistent with earlier studies of U.S. and Japanese universities (Richards, et al., 1970; Richards, 1973), but with enough variation to support the appropriateness of these techniques

for studying national differences in university environments. Therefore, this study helps provide a broader, more international context for studying university characteristics. Because all Commonwealth universities are influenced to some degree by a common heritage, it would be highly desirable to study universities in a larger, more inclusive set of nations. Some of the results for British Commonwealth universities should hold for universities in all nations. That is, large nations should generally have large universities, and wealthy nations should have large affluent universities. Also, Holland's theory (1973) and Maslow's (1954) notion of a hierarchy of needs would lead to the expectation that universities in wealthy nations would place relatively high emphasis on Artistic fields. Other results of this study might be more specific to the British Commonwealth and therefore might be expected to change in a broader sample of nations. For example, developing nations would be expected to place heavy emphasis on development of agriculture and major civil engineering projects, such as roads, dams, and the like. In a broader sample of nations, this might produce a substantial negative correlation between National Wealth and emphasis on education for Realistic fields. Similarly, the most obvious bias in this set of Commonwealth nations is the absence of nations explicitly committed to the Communist ideology. Such nations might be expected to place more emphasis than other nations on engineering related to the needs of industry and on the physical sciences. Therefore, national Political Orientation (using this study's scoring system) might be positively correlated with an emphasis on education for Realistic and Investigative fields if more Communist nations were included.

Finally, universities may not provide a single environment, but rather

multiple sub-environments. The results for Oxford and Cambridge colleges obtained in this study suggest that these same techniques can be useful for describing such sub-environments.

Footnotes

1. For reprints write to James M. Richards, Jr., Center for Social Organization of Schools, Johns Hopkins University, Baltimore, Md. 21212.
2. Inclusion of universities from a given nation, of course, implies neither approval nor disapproval of the social and political organization of that nation.
3. It appeared more efficient, and more appropriate to the Yearbook data, to calculate these measures directly rather than first conducting a similar factor analytic investigation of Commonwealth universities.
4. It should be reemphasized that the type measures are ipsative so the significance tests are not entirely independent.
5. The author is grateful to Dr. Nancy Cole for carrying out the computations.

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Table 1

Measures of Central Tendency and
Variability for Faculty Types

Type Scores: Number of Faculty who are:	Mean ($\sqrt{N}$)	S.D. ($\sqrt{N}$)
Realistic	5.15	3.37
Investigative	11.29	5.80
Artistic	6.87	3.38
Social	6.63	5.86
Enterprising	4.94	2.83
Conventional	1.03	1.22

Per Cent of Faculty who are:	Median	Semi-Inter Quartile Range
Realistic	7.96	6.29
Investigative	42.14	9.67
Artistic	17.17	6.42
Social	14.86	6.54
Enterprising	8.71	3.51
Conventional	0.13	0.40

Table 2

Correlations of Type Scores with Size, Affluence and Technological Emphases for all Commonwealth Universities Combined

(N = 186)

Type Scores	Size	Affluence	Technological Emphasis
Number of Faculty who are:			
Realistic	58**	-19**	33**
Investigative	84**	03	-04
Artistic	80**	08	-38**
Social	48**	06	-29**
Enterprising	73**	05	-26**
Conventional	52**	-05	-23**
Per Cent of Faculty who are:			
Realistic	11	-28**	61**
Investigative	27**	01	33**
Artistic	-05	12*	-57**
Social	-10	17**	-62**
Enterprising	01	06	-29**
Conventional	28**	-03	-22**

* $p < 05$
** $p < 01$

Table 3

Correlations of Type Scores with Size, Affluence, and Technological Emphasis for Universities in Individual Nations

	Britain (N = 50)			Canada (N = 48)		
Type Scores	Size	Affluence	Technological Emphasis	Size	Affluence	Technological Emphasis
Number of Faculty who are:						
Realistic	72**	-24	20	68**	05	36*
Investigative	91**	-03	-06	94**	-08	12
Artistic	79**	15	-57**	87**	-18	01
Social	37**	-01	-28*	90**	-19	-10
Enterprising	82**	-11	-12	82**	-08	04
Conventional	56**	-28*	-21	55**	-23	-01
Per Cent of Faculty who are:						
Realistic	33*	-38**	45**	20	18	72**
Investigative	28*	-06	42**	54**	04	48**
Artistic	-20	22	-60**	-43**	-13	-45**
Social	-02	20	-56**	-15	-21	-75**
Enterprising	01	-18	04	-11	22	-20
Conventional	41**	-32*	-22	22	-21	01

* $p < 05$
** $p < 01$

Table 4

Correlations Between National Characteristics and Average Characteristics of Universities Within Nations

(N = 27)

	Characteristics of Nation		
	Size	Wealth	Political Orientation
Environmental Measures			
Size	.55**	.43*	-.44*
Affluence	-.26	.38*	.30
Technological Emphasis	.16	-.28	.29
Number of Faculty who are:			
Realistic	.66**	-.01	-.09
Investigative	.52**	.30	-.40*
Artistic	.42*	.59**	-.43*
Social	.28	.12	-.05
Enterprising	.14	.05	-.17
Conventional	.22	.53**	-.49**
Per Cent of Faculty who are:			
Realistic	.44*	-.15	.09
Investigative	.05	.12	-.10
Artistic	-.21	.47**	-.17
Social	-.32	-.16	.41*
Enterprising	-.37	-.26	.14
Conventional	.12	.41*	-.37

* $p < .05$
** $p < .01$

FIGURE CAPTION

Figure 1 - Spatial configuration of type and college vectors. Cambridge colleges corresponding to numbers are: (1) Christs, (2) Churchill, (3) Clare, (4) Clare Hall, (5) Corpus Christi, (6) Darwin, (7) Downing, (8) Emmanuel, (9) Fitzwilliam, (10) Girton, (11) Gonville and Caius, (12) Jesus, (13) Kings, (14) Lucy Cavendish, (15) Magdalene, (16) New Hall, (17) Newnham, (18) Pembroke, (19) Peterhouse, (20) Queens, (21) St. Catherines, (22) St. Edmunds, (23) St. Johns, (24) Selwyn, (25) Sidney Sussex, (26) Trinity, (27) Trinity Hall, and (28) University. Oxford colleges are: (29) All Souls, (30) Balliol, (31) Brasenose, (32) Christ Church, (33) Corpus Christi, (34) Exeter, (35) Hertford, (36) Jesus, (37) Keble, (38) Lady Margaret Hall, (39) Linacre, (40) Lincoln, (41) Magdalen, (42) Merton, (43) New College, (44) Nuffield, (45) Oriel, (46) Pembroke, (47) The Queen's College, (48) St. Anne's, (49) St. Antony's, (50) St. Catherine's, (51) St. Cross, (52) St. Edmund Hall, (53) St. Hilda's, (54) St. Hughs, (55) St. Johns, (56) St. Peters, (57) Somerville, (58) Trinity, (59) University, (60) Wadham, (61) Wolfson, and (62) Worcester.

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